Use of the alpha-2-adrenoceptor agonists medetomidine and dexmedetomidine in the sedation and analgesia of domestic cats

ABSTRACT

The racemate medetomidine (MED), an alpha-2-adrenoceptor agonist, and its dextro-rotatory optical isomer dexmedetomidine (DEX) were studied in cats. The sedative effect of oral-mucosal application of MED and selected pharmacokinetic variables were evaluated and compared with intramuscular (I.M.) administration of the same dose of drug (n = 7). Sedative and analgesic effects of MED were also studied at different dose levels following either I.M. administration (n = 6) or continuous intravenous (I.V.) step infusion in cats (n = 6) and further compared with sedation and analgesia induced by equivalent doses of DEX (half the dose of MED). The effectiveness of using MED for post-operative pain relief in cats (n = 64) that had undergone ovariohysterectomy was evaluated and compared with butorphanol. The relationship between plasma and cerebrospinal fluid (CSF) concentrations of MED and how these concentrations vary with the levels of sedation in experimental rabbits (n = 23) were studied with the assumption that similar relationships may exist in cats.

The results obtained indicated that oral-mucosal application of MED is effective for sedating cats and that when salivation and vomiting are minimal or absent, systemic drug availability and the extent of sedation are comparable between the oral-mucosal and I.M. routes. Maximum blood concentration of MED and clinical sedation are reached later with oral-mucosal application than with I.M. administration. Both MED and DEX induce dose-dependent sedation and analgesia in cats that reach ceiling doses, beyond which sedation may be reduced. DEX (at half the dose of MED) is as effective as MED for the sedation and analgesia of cats. The sedative and analgesic effects of MED in cats are mediated predominantly via its dextro-rotatory optical isomer. The levo-rotatory isomer in MED may introduce some inconsistencies to the therapeutic effects of the drug at high doses and make the effects of MED unpredictable in terms of dose variation. The presence of the l-isomer in MED may not always be of therapeutic disadvantage. Intramuscularly administered MED relieves post-operative pain in cats, but it is not as potent as butorphanol. Serum concentration of MED predicts the concentration of MED in the CSF of rabbits. Increasing the concentration of MED in the CSF will not necessarily lead to an increase in the level of sedation.